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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
QI, ZHI QIANG	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/296,588	LU ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The Final Office Action mailed on Jan.30, 2004 is vacated and prosecution is reopened.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3, 10-14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3, 10 and 17, recitation ". . .electrode includes a conducting amorphous layer. . ., said amorphous layer comprises . . ., SiO_2, Si_3N_4 and TiO_2" as claimed in claim 3; and recitation ". . . electrode includes a conducting diamond-like amorphous carbon layer . . ., said amorphous carbon layer comprises . . . SiO_2, Si_3N_4 and TiO_2" as claimed in claim 10; and recitation ". . . forming a conducting amorphous layer on . . . electrode . . . , said amorphous carbon layer comprises . . . SiO_2, Si_3N_4 and TiO_2" as claimed in claim 17, that are indefinite. SiO_2, Si_3N_4 and TiO_2 are (simply) insulating materials, it is unclear to how these materials form a "conducting" layer without having any conductive material in them.

Claims 11-14 are dependent on the claim 10, so that all the dependent claims have the deficiency set forth above.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 5, 7, 15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,344,888 (Yasukawa) in view of US 4,826,293 (Grinberg et al).

Claims 1-3, 7, 15-17, Yasukawa discloses (col.6, line 48 – col.7, line 52; col.15, lines 25-52; Figs. 1 and 7) that a reflection liquid crystal panel comprising:

- a counter electrode (common electrode 33) composed of a transparent electrode (ITO), i.e., a first-type electrode or a transmissive electrode;
- a reflective electrode (pixel electrode 14), i.e., a second-type electrode or a reflective electrode positioned opposite the transmissive electrode (the transmissive electrode is an opposite type of the reflective electrode);
- a liquid crystal material (37) between the transmissive electrode (33) and the reflective electrode (14);
- a passivation film (17) is formed on the entire pixel electrode (14) which is adjacent the liquid crystal material, and the passivation film (17) covering a region outside the region in which the liquid crystal is encapsulated, such that the passivation film (17) is adjacent the liquid crystal material.

Yasukawa does not explicitly disclose that the electrode is a conducting

amorphous layer and the conducting amorphous layer has a resistivity between 10^4 and 10^{11} ohm-cm.

However, Grinberg discloses (col.5, line 2 – line 29) that the resistivity of a partially conductive layer is within a range of about 10^9–10^{11} ohm-cm, and partially conductive means that the layer partially is a conductor and partially is an insulator, and that suitable partially conductive material include silicon dioxide, amorphous silicon. Grinberg further discloses a doped SiO_2 having a resistivity of $2x10^{10}$ ohm-cm. Grinberg indicates (col.5, line 65 – col.6, line 7) that a proper selection of the resistance of the partially conductive layer (as electrode), the pixel voltages established across the liquid crystal from an electron beam scan can be made AC rather than DC, and using an AC voltage to establish the polarization shift without the decomposition effects of DC operation, that is a distinct advantage.

According to MPEP 2144.05, in the case where the claimed range "overlap or lie inside ranges disclosed by the prior art (such as the range 10^4-10^{11} ohm-cm overlaps the range 10^9–10^{11} ohm-cm)" a prima facie case of obviousness exists.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to employ a conducting amorphous layer having a particular resistance of the partially conductive layer (conducting resistivity) as claimed in claims 1-3, 7-10, 14-17 for establishing the polarization shift without the decomposition effects of DC operation.

Claims 5 and 19, Yasukawa discloses (col.7, lines 37-38) that a polyimide alignment film is formed on the entire passivation film (17), i.e., a polyimide layer is

formed between the passivation film (as the amorphous layer) and the liquid crystal material.

5. Claims 8-10, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,344,888 (Yasukawa), US 4,826,293 (Grinberg et al) as applied to claims 1-3,5,7,15-17 and 19 above, further in view of US 4,640,744 (Howe).

Claims 8-10 and 14, lacking limitation is such that the electrode is a conducting diamond-like amorphous carbon layer has a resistivity between 10^4 and 10^{11} ohm-cm.

However, Howe discloses (col.3, line 56 – col.5, line 27) that amorphous carbon (carbon having a diamond-like structure) can be used in any film, and the resistivity of the amorphous carbon can be controlled over the range from about 0.1 to greater than 10^{11} ohm-cm, and the amorphous carbon is utilized as a film which has been deposited on a substrate which is an electrically conducing material, and such amorphous carbon is utilized in the fabrication of highly effective electrodes (col.3, lines 57-60).

Therefore it would have been obvious to those skilled in the art at the time the invention was made to use amorphous carbon layer as disclosed by Howe for obtaining a highly effective electrodes.

Claim 12, Yasukawa discloses (col.7, lines 37-38) that a polyimide alignment film is formed on the entire passivation film (17), i.e., a polyimide layer is formed between the passivation film (as the amorphous layer) and the liquid crystal material.

6. Claims 4, 11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasukawa, Grinberg and Howe as applied to claims 1-3, 5, 7-10, 12,14-17 and 19 above, and further in view of US 5,990,988 (Hanihara et al).

Claims 4, 11 and 18, lacking limitation is such that the amorphous layer has a unidirectional orientation matched to the liquid crystal material.

However, Hanihara discloses (col.5, line 41 – col.6, line 37; Fig.1) that an alignment film (8) made of silicon oxide (amorphous) is formed on the electrode (7), such that amorphous layer has a function to be an alignment film (having a unidirectional orientation matched to the liquid crystal material), and also functions as a protection film (passivation). Hanihara also indicated (col.5, lines 54-55) that such structure the black matrix (9b) provided in the conventional display panel shown in Fig.10 is obviated, and such liquid crystal panel thereof is miniaturized and easy to manufacture(col.3, lines 54-57).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use amorphous layer serving as orientation as claimed in claims 4, 11 and 18 for achieving easy to manufacture.

7. Claims 6, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasukawa, Grinberg and Howe as applied to claims 1-3, 5, 7-10, 12,14-17 and 19 above, and further in view of Applicant admitted prior art (AAPA).

Claims 6, 13 and 20, lacking limitation is such that a voltage between the pixel electrode and the common electrode varies the transparency of the liquid crystal material.

However, AAPA discloses (col.3, lines 1-4) that varying the voltage to the electrode (106) (the pixel electrode) controls the liquid crystal cell (111), such that different amount of light are transmitted across the liquid crystal display (different

transparency of liquid crystal material), thus resulting in the display of a gray scale of light.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a voltage between the transmissive electrode and the reflective electrode varies the transparency of the liquid crystal material as claimed in claims 6, 13 and 20 for achieving a display of gray scale as taught by AAPA.

Response to Arguments

8. Applicant's arguments filed on Jun. 18, 2004 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The reference Yasukawa does not teach or suggest "a conducting amorphous layer has a resistivity between 10^4 and 10^{11} ohms-cm". The reference Grinberg utilizes this layer as an insulator.

2) The reference Hanihara does not teach a diamond-like conductive layer.

3) The AAPA does not teach a conducting amorphous layer as claimed.

Examiner's responses to Applicant's arguments are as follows:

1) The reference Yasukawa combines the secondary references that read the limitations as claimed. The reference Grinberg discloses (col.5, line 2 – line 29) that the resistivity of a partially conductive layer is within a range of about 10^9–10^{11} ohm-cm, and partially conductive means that the layer partially is a conductor and partially is an insulator. Grinberg indicates (col.5, line 65 – col.6, line 7) that a proper selection of the

resistance of the partially conductive layer (as electrode), the pixel voltages established across the liquid crystal from an electron beam scan can be made AC rather than DC, and using an AC voltage to establish the polarization shift without the decomposition effects of DC operation, that is a distinct advantage. Therefore, Gringberg teaches that amorphous layer is utilized as partially conductive layer and selection of the resistance. According to MPEP 2144.05, in the case where the claimed range "overlap or lie inside ranges disclosed by the prior art (such as the range 10^4-10^{11} ohm-cm overlaps the range 10^9–10^{11} ohm-cm)" a prima facie case of obviousness exists.

2) The reference Hanihara is relied on to teach the amorphous layer having an unidirectional orientation matched to the liquid crystal material.

3) The AAPA is relied on to teach that using voltage varies a transparency of the liquid crystal material.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) US 4,972,250 (Omori et al) discloses (col.3, line 7 – col.4, line49) that the passivation material is amorphous carbon or diamond-like carbon, and such semi-conductive passivation material having diamond-like carbon characteristics dissipates charge build-up very quickly so that drift problems are minimized.

2) US 4,084,986 (Aoki et al) discloses (abstract) that the amorphous layer can be converted into a semi-insulating layer having a resistivity of 10^7–10^{11} ohm-cm, which has improved passivation property.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
July 19, 2004

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